AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (*Currently Amedded*) A method for the heat treatment of shaped bodies made of a superconducting material based on (Y/Rare Earth)BaCuO, wherein Y/Rare Earth signifies at least one element selected from the group of elements consisting of Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho. Er. Tm, Yb, and Lu, characterised in that a coating ~~consisting of a coating~~ material is applied to at least one part of at least one surface of the shaped body, whereby the coating material melts at least partially at a lower temperature than the material of the shaped body ~~or/and is flowable at a lower temperature than that material~~, whereby the shaped body together with the applied coating material is heated to a desired temperature at which the material of the shaped body does not yet partially melt ~~or/and is not yet flowable~~ but at which the coating material is at least partially softened by the heat ~~or/and is in a flowable state~~, and whereby at least one part of a region of the shaped body located near the surface is modified at ~~this~~ a temperature ~~or/and during a succeeding cooling process~~ at a temperature at least as high as said desired temperature, in that the coating material completely or at least partially infiltrates the region of the shaped body located near the surface, and wherein the shaped body treated in such a manner is enriched with oxygen ~~during the cooling process or/and during a succeeding heat treatment~~ whereby the modification contributes to the increase in at least one of the remanent induction ~~or/and to the increase in~~ the critical current density of the shaped body enriched with oxygen.

2. (*Currently Amended*) A method in accordance with claim 1, characterised in that the superconducting material contains at least one ~~Rare Earth element including lanthanum and yttrium~~of said group of elements and also at least barium, copper and oxygen and ~~possibly~~optionally elements selected from the group consisting of Be, Mg, Ca, Sr, Zn, Cd, Sc, Zr, Hf, Pt, Pd, Os, Ir, Ru, Cu, Ag, Au, Hg, Tl, Pb, Bi and S.

3. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the shaped body of the superconducting material was produced by a process selected from the group consisting of a melt-texturising process, ~~by~~ a zone-melting process, ~~by~~ a single crystal growth process or by producing a texturised polycrystalline superconducting material.

4. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that~~, prior to or/and after the modification thereof,~~ the shaped body of the superconducting material comprises one to one hundred grains or/and one to one hundred domains, preferably just one grain and up to four domains.

5. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that at least one of the untreated ~~or/and the treated~~ shaped body of the superconducting material, the treated shaped body of the superconducting material, the coating material ~~or~~/and the layer of material includes phases which are selected from the group of phases

corresponding to an approximate composition of $Y_1Ba_2Cu_3O_v$, $Y_2Ba_1Cu_1O_w$, $Yb_1Ba_2Cu_3O_{v'}$, $Yb_2Ba_1Cu_1O_{w'}$, $Er_1Ba_2Cu_3O_{v'}$, $Er_2Ba_1Cu_1O_{w'}$, $Sm_1Ba_2Cu_3O_{v''}$, $Sm_2Ba_1Cu_1O_{w''}$, $Nd_1Ba_2Cu_3O_{v'''}$, $Nd_4Ba_2Cu_2O_{w'''}$, Y_2O_3, CeO_2, Pt, PtO_2, Ag and AgO_2, where at least one of Y, Yb, Sm ~~or/~~and Nd may also be partially substituted by other lanthanides or Y, and wherein other related chemical elements may occur in at least one of Ag ~~or/~~and AgO_2.

6. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the untreated ~~or/and the treated~~ shaped body of the superconducting material, the treated shaped body of the superconducting material, the coating material ~~or/~~and the layer of material comprise at least one of calcium ~~or/~~and other cations which alter the band structure of the electrons and contribute to the higher critical transport current densities.

7. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that at least one of the shaped body of the superconducting material ~~or/~~and the coating material comprise at least one gradient in regard to at least one of the chemical composition, the grain structure ~~or/and~~, the peritectic flow temperature and~~or~~ the peritectic melting temperatures.

8. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the coating material is applied such as to have a layer thickness in the range from 1 µm to 5 mm~~, preferably 10 µm to 3 mm, and especially preferred from 50 µm to 2 mm~~.

9. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the coating material is applied in ~~the~~a form comprising at least one of a powder, a shaped body ~~or~~/and a coating~~—the powder preferably being a powder mixture or in granular form, the shaped body is preferably a compressed, a calcinated, a sintered or a molten shaped body, and the coating is preferably in the form of a physically or/and a chemically deposited coating that is basically produced by precipitation, sputtering or spray-pyrolysis~~.

10. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that a powder-like coating material is applied by a coating process comprising at least one of:~~;~~

~~that~~placing a shaped body of the coating material ~~is placed~~ on the corresponding surface of the shaped body of the superconducting material, ~~or~~/and

~~that~~effecting the coating process ~~is effected~~ from the gas phase, from a solution or suspension or by using an aerosol.

11. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the coated shaped body of the superconducting material is maintained at ~~a~~said desired temperature ~~corresponding to claim 1~~ until such time as a part of the material penetrates or diffuses into the superconducting material.

12. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that, during the modification of the superconducting material, a gradient is produced in at least one of the shaped body of the superconducting material ~~or~~/and ~~in~~ the layer of material produced from the coating material.

13. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that ~~the~~at least one of residual crystal nuclei, the layer of material ~~or~~/and ~~the~~an uneven surface of the shaped body is mechanically removed after the modification of the superconducting material, and in that the shaped body is subjected thereafter to a heat treatment if necessary.

14. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that a shaped body of the superconducting material is produced substantially in the form of at least one of plates, solid cylinders, hollow cylinders, rings, discs, bars, tubes, wires, tapes or coils.

15. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that the shaped body of the superconducting material is in direct contact only with at least one of a superconducting material based on (Y/Rare Earth)BaCuO and~~, possibly, with~~ a coating material, during the firing and heat treatments.

16. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that a large-sized shaped body of the superconducting material comprises a plurality of mutually spaced crystal nuclei whose c-axes are oriented along one of the main ~~axes or main~~ directions of the geometry of the shaped body ~~or are at right angles thereto~~.

17. (*Currently Amended*) A method in accordance with ~~at least one of the preceding claims~~claim 1, characterised in that a large-sized shaped body of the superconducting material is produced in a plurality of segments, which are ~~jointed~~joined together if necessary, ~~especially~~ by heat treatment at ~~a~~ said desired temperature ~~corresponding to claim 1~~, possibly by the application of pressure and possibly by the addition of a coating material to the boundary surfaces that are to be jointed together.

18-23. (*Cancelled*).

24. (*Currently Amended*) The use of a shaped body consisting of a superconducting material produced in accordance with ~~any of the claims 1 to 17~~claim 1 on the basis of (Y/Rare Earth) BaCuO, for transformers, current breakers, power leads, magnetic screenings, magnetic bearings or/and as magnets, especially as cryogenic bearings, in flywheel storage devices, in particle accelerators, in the rotors of electrical machines.

25. (*Cancelled*).

26. (*New*) A method in accordance with claim 8, characterised in that the coating material is applied with a layer thickness in the range from 10 μm to 3 mm.

27. (*New*) A method in accordance with claim 26, characterised in that the coating material is applied with a layer thickness in the range from 50 μm to 2 mm.

28. (*New*) A method in accordance with claim 9, characterised in that the coating material is applied in a form of a powder, the powder being a powder mixture or in granular form.

29. (*New*) A method in accordance with claim 9, characterised in that the coating material is applied in a form of a shaped body which is a compressed, a calcinated, a sintered or a molten shaped body.

30. *(New)* A shaped body as claimed in claim 29, characterised in that it consists of more than 90 Vol.-% of said one phase of the composition.

31. *(New)* A shaped body as claimed in claim 30, characterised in that it consists of more than 95 Vol.-% of said one phase of the composition.

32. *(New)* A shaped body in accordance with claim 22, characterised in that it has a critical transport current density of at least 6×10^4 A/cm^2.

33. *(New)* A shaped body in accordance with claim 32, characterised in that it has a critical transport current density of at least 8×10^4 A/cm^2.